



Varietal responses to Regulated Deficit Irrigation

Viti-note Summary:

- White varieties
- Shiraz
- Cabernet Sauvignon
- Merlot
- Grenache

Other topics in this Viti-Notes series include:

- How to start irrigating with less water
- An introduction to Regulated Deficit Irrigation
- Limitations of Regulated Deficit Irrigation
- Scheduling Regulated Deficit Irrigation
- *Varietal responses to Regulated Deficit Irrigation*

Regulated Deficit Irrigation (RDI) research was initially conducted on Shiraz vines and most published information on RDI addresses how this variety responds to a water deficit. The RDI technique has since been applied to several varieties, with experience suggesting that different varieties respond in their own way when water is restricted.

In general terms, water deficits result in a slowdown in the rate of extension of internodes, indicating that shoot length (and therefore canopy size) is under control. Tendrils are the parts of shoots which show the most obvious signs of moisture stress, losing turgidity and often falling off under significant stress. Leaf loss due to stress is most likely to occur close to the base of the shoots, although a general assessment of leaf condition and status of tendrils is the best guide. Loss of leaves is normally regarded as a sign that the water restriction is too severe.

For red wine varieties a reduction in berry size and early control over growth of the vine canopy are potential quality-enhancing outcomes from applying RDI.

White varieties

Berry size and skin-to-pulp ratios for colour extraction are not relevant in white varieties, but implementing RDI for canopy management may still be useful for reducing excess vegetative growth; however, for most situations, RDI is not recommended. Furthermore, too much bunch exposure increases the risk of damage to berries due to sunburn, and high temperatures can affect the development and retention of flavour.

Shiraz

RDI research using Shiraz and subsequent experience in commercial vineyards has indicated that berry size can be reduced by 20 - 30%. A reduction in shoot growth has also been observed, with the degree depending on the level of deficit applied. Shiraz growth will slow down and show symptoms of water deficits more readily than other varieties, thus visual symptoms in Shiraz are extremely useful in gauging the impact of water deficit. Shiraz vines look generally shabby and limp while under a water deficit, but have a remarkable capacity to recover and return to a healthy appearance when normal irrigations are applied after the deficit period.

Cabernet Sauvignon

Evidence suggests that Cabernet Sauvignon vines need a higher proportion of functioning leaves than Shiraz for optimum bunch development and that general vine performance is better when water availability is not abruptly changed. Whereas in Shiraz canopy symptoms of water deficit are obvious, in Cabernet it appears that fruit shrivels before any basal leaf drop is observed. This makes it more difficult to use visual signs to determine when sufficient deficit has been induced.

Cabernet Sauvignon naturally has relatively small berries and a reduction in berry size through RDI is not an important management target. Use of RDI to achieve control over canopy growth has been practiced although many now consider that if very vigorous canopies are an issue, then applying limited irrigations at the start of the growing season is a better strategy, although careful timing is required to avoid impacting on developing buds and future fruitfulness.

Merlot

More studies of the impacts of water deficit on Merlot are required before recommendations can be made about using RDI to manage this variety. Similar to Cabernet Sauvignon, visual signs of water deficit usually become obvious only after the vine has possibly experienced too much deprivation for continuing good health. Soil moisture monitoring technology and regular readings are therefore critical, as visual symptoms are often only apparent after the vine has been set back too severely to ensure optimal production. This is relevant, not only during the RDI period from fruit set to veraison, but also from veraison through to ripening. In practice, RDI is rarely used for Merlot.

Grenache

There has not been wide use of RDI on Grenache—but from limited grower experience it is reported that the same benefits achieved for Shiraz are not readily transferred to Grenache. While RDI may be applied as one of a number of tools there is a belief that knowledge of wider issues such as optimum crop loads and canopy architecture to suit local soils and climate should direct management of this variety.

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Further information

Nicholas, P. 2004. Soil, irrigation and nutrition. Adelaide: Winetitles.

Articles about Regulated Deficit Irrigation and other water management techniques are available to the Australian wine industry through the Australian Wine Research Institute library. Visit <http://www.awri.com.au/contact/> for details.

For information on drought management, go to Innovator Network Resources at www.gwrdc.com.au.

Product or service information is provided to inform the viticulture sector about available resources and should not be interpreted as an endorsement.



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